

# AI 1103 : Probability and Random Variables

## ASSIGNMENT 2

AI20BTECH11026

**Problem:** Savita and Hamida are friends. Hamida do not have birthdays on different days.  
What is the probability that both will have  
(i) different birthdays?  $\therefore pr(A) = 1 - pr(B)$   
(ii) the same birthday?  $\therefore pr(A) = 1 - 0.99726027 \dots (From(i))$   
(ignoring a leap year).  $(Prob, 5.21)$   $\therefore pr(A) = 0.00273972$

### Solution:

Let  $pr(A)$  be the probability that Savita and Hamida have their birthdays on a same day. Hence, the probability that Hamida and Savita have their birthdays on the same day of the year is 0.00273972 and on different days of the year is 0.99726027.

Let  $pr(B)$  be the probability that Savita and Hamida have their birthdays on different days. Link to the code:  
Savita's Birthday can be on any day of a non-leap year. Hamida's birthday can also be on any of the 365 days of the same year. We consider all of these 365 outcomes to be *equally likely*. <https://github.com/tanayyadav28/Assignments/blob/main/Assignment%202/code/assignment2.py>

Considering Savita to have her birthday on a particular day, for Hamida's and Savita's birthday to be different, there are  $(365 - 1) = 364$  favourable outcomes.

$$\therefore pr(B) = \frac{364}{365}$$
$$\therefore pr(B) = 0.99726027 \dots (i)$$

Now, Savita and Hamida having their birthdays on the same day is the event that Savita and